

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



Sequestration

01/2004

A SEA FLOOR GRAVITY SURVEY OF THE SLEIPNER FIELD TO MONITOR CO₂ MIGRATION

Background

In order for geologic sequestration of carbon dioxide to be a viable option for reducing greenhouse gas emissions, techniques have to be developed to monitor the emplacement and sequestration of carbon dioxide in an underground geologic environment. This project seeks to apply high precision gravitational surveying techniques to quantify the change in the local gravitational field associated with the sequestration of carbon dioxide.

The Sleipner West natural gas field in the North Sea produces carbon dioxide. To avoid paying a tax on carbon dioxide emitted into the atmosphere, Statoil, which owns the field, has been injecting most of this carbon into a saline aquifer, the Utsira formation, about 1,000 meters beneath the sea. The Utsira formation is a permeable sandstone saline aquifer about 200-250 meters thick and is overlain by mudstone. The studied site covers an approximately 3 x 7 km area, and the water depth averages about 300 meters.

CONTACT POINTS

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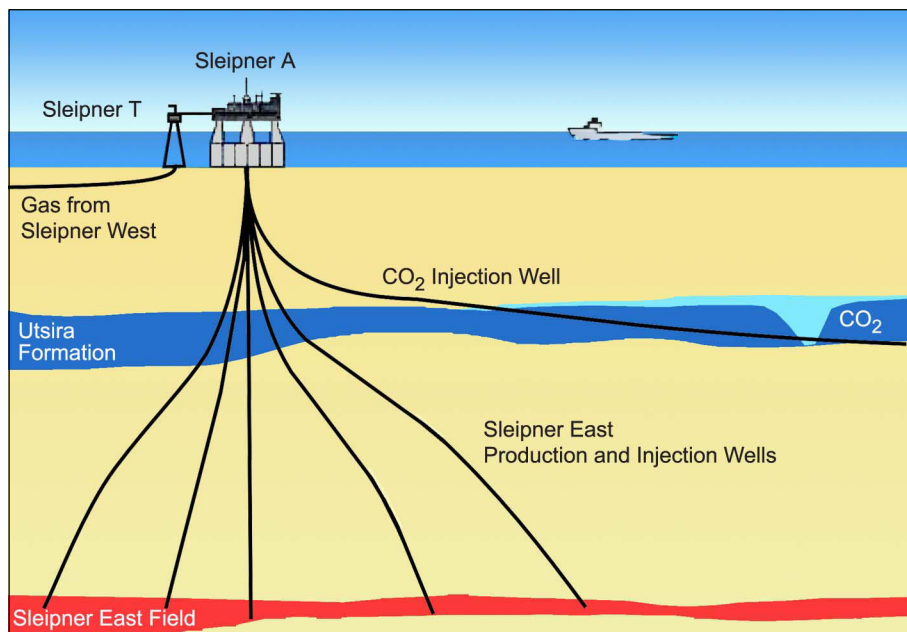
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Schematic Cross-section of geologic strata for the Sleipner project



CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov

PARTNERS

University of California,
San Diego

Statoil

COST

Total Project Value:
\$384,860

DOE/Non-DOE Share:
\$224,860 / \$160,000

Primary Project Goal

The primary project goal is to quantify the change in the local gravitational field associated with the sequestration of carbon dioxide in the saline aquifer below the bed of the North Sea so as to assess the ability of microgravity techniques to monitor geologically sequestered carbon dioxide. This study will utilize high precision gravitational surveying techniques along with seismic data.

Objectives

- Perform a high precision gravitational survey over the portion of the Utsira formation undergoing carbon dioxide sequestration
- Reduce and analyze the gravitational potential field data to discriminate zones of geologic formation infused with carbon dioxide
- Use results of this application of high precision gravitational surveying techniques to monitor sequestration of carbon dioxide in a saline aquifer

Accomplishments

Successfully conducted a microgravity survey with better-than-expected repeatability

Benefits

This project will develop new techniques to monitor CO₂ migration in a saline aquifer. Successful monitoring and verification are necessary to confirm that saline aquifers are a satisfactory repository for CO₂ and can be used to reduce greenhouse gas intensity by providing a viable geologic CO₂ sequestration option.



Deployment of the Remotely Operated Vehicle with a Deep Ocean Gravimeter (ROVDOG)